

Yet, by the marvellous aid of the prism with a narrow slit in front of it, there appear to be every year more and more persons who can accomplish the feat, and feel extraordinary satisfaction, even exhilaration, in the act of so doing. Wherefore after reading Mr. Capron's earlier pages, laying down what the rain-band, as seen in the spectroscope, really is, how it is to be observed, recorded, and concluded upon, the percentage of its correctness, and the kind of assistance it may afford to other methods of weather prediction in meteorology,—we have had still more pleasure in coming to his Part II., on "The Rain-Band Vindicated." For therein he describes succinctly the contests which have been recently going on in the meteorological world on the subject, and the rise of many new authors, either bringing in most varied experiences to show the truth of the principle, or still better publishing extensions of it. While from one of Professor Sir Henry Roscoe's earliest works on spectroscopy in general, and the telluric additions to the lines of the solar spectrum in particular,—is extracted this paragraph, which deserves to live.

"No one can tell what secrets lie hid in these atmospheric lines, but to us it seems that by their careful and systematic observation, 'the Message from the Stars' which has taught us so much, may be rivalled in practical importance by a 'Message from the Sky.'"

And the harvest to be gathered is still on the increase ; for since the appearance of Mr. Capron's last edition, a new observer in unusually exalted circumstances of temperature, sunshine, and moisture (viz. Mr. Maxwell Hall, in Jamaica), almost at once discovered another rain-band, not in the red, but in the green of the spectrum ; and as super-excellent for prediction-use in that tropical island, as our D rain-band in the red is to ourselves at home. What wonder, then, that so able a physicist and astronomer writes, and with such hope and joy too of soon having more leisure to devote to science,—writes, we repeat, that although he has not yet settled the exact line of research he will devote himself to,—it must be "something spectroscopic."

Notwithstanding too that, as yet, the rain-band spectroscope has only been employed by day, in noting the dark, or so-called Fraunhofer, lines and bands on the bright continuous spectrum of the sun-illumined clouds or sky,—there seems a new utilisation of it opening up in detecting aurora, when otherwise invisible, by its unique bright citron line in a dark field at night ; and thereby affording men another kind of rainfall prediction, even so much as forty-eight hours beforehand.

In conclusion, though not exactly touching on rain-band, we should call attention to Mr. Capron's appendix, descriptive of his well-arranged and successfully carried out observations on atmospheric electricity, as likely to lead eventually to something practical and exceedingly important. For, as M. Gaston Planté has long held in Paris, he has never yet known a storm of wind which was not accompanied by measurable disturbances of electricity ; and with indications that the whole quantity of that fluid, lying latent in the earth, is a store of almost unimaginably large quantity, derived from the Creation Age, and only very slowly escaping ; while man is still merely looking on, and unable to turn it to any useful account.

C. P. S.

OUR BOOK SHELF

A Manual of Surgery. In Treatises by various Authors. 3 vols. Edited by Frederick Treves, F.R.C.S. (London : Cassell and Co., 1886.)

MESSRS. CASSELL, in issuing these volumes among their manuals for students of medicine, did wisely in invoking the aid of some thirty hospital surgeons, who have in these three handy volumes produced a very practical work of high excellence.

In comparing such a work as the present with a book on surgery written fifteen or even ten years ago, we are at once struck, on the one hand, by the number of new operations which have been introduced, mainly owing to antiseptic surgery ; and, on the other, by the much greater definiteness and accuracy with which diseases and lesions are defined and differentiated from one another. As a consequence, the material is so extensive in amount that operative surgery and pathology will occupy additional volumes.

The relations of micro-organisms to septicæmia, pyæmia, and the treatment of wounds, receive full discussion, extending over several chapters. There is a valuable chapter by Mr. Mills, Anæsthetist to St. Bartholomew's Hospital, on the production of anæsthesia and the means of dealing with the difficulties that may occur.

In the discussion of knee-joint disease a much more favourable view of the benefit of rest is taken than would accord with our experience, and it is stated that with the application of splints the great majority of cases will end in complete recovery in six to nine months. This result, however, is surely uncommon, and too often the pulpy mischief progresses until, after months or years of rest, the patient is able to get about again with a limb liable to lay him up after the slightest exertion, or it has ultimately to be amputated. On the other hand, the permanent good results which are obtained by excision of the knee are much under-estimated, and, instead of falling more and more into disuse, the operation will in the future often be the means of saving limbs that are now amputated, especially when the excellent results that can be shown for a long series of cases have been published.

Abdominal surgery receives ample notice, and in no department during the last ten years has greater progress been made ; many injuries and diseases which were formerly necessarily fatal are now amenable to operation. Continental surgeons, able to perform trial operations on animals, are far more successful in their operations on the intestines than we are, and every year human lives are offered up as a holocaust to the fanaticism of the anti-vivisectionists. It is to the physiologists that we are indebted for the elaboration of the various steps by which success is now achieved both in these operations and in those on the brain.

The general excellence of the illustrations, which number 200, is worthy of note ; and while many are original, not a few have been selected from other books. There is no doubt that each year it becomes more easy to obtain typical illustrations of disease. We would therefore take exception to the illustrations of the teeth of congenital syphilis, of myxoedema, and of single hare-lip, of which more characteristic examples might have been taken.

The handy form of the volumes, as well as the practical nature of the book, will insure its popularity among students.

L'Évolution et la Vie. Par Denys Cochin. (Paris : Masson, 1886.)

This work, which is a *réchauffé* of the ordinary facts of digestion as given in the text-books, and of the relations of micro-organisms to vital processes, and more especially of Pasteur's work on the subject, must have been written chiefly for the author's amusement. It opens with a pro-

test against Herbert Spencer's application of the principles of evolution to the solution of vital, social, and mental problems. The author then proceeds to set up a ghost founded on the statement made some years ago, that "there is no evolution without spontaneous generation." To refute the theory of spontaneous generation will be, he says, to give a direct blow to the theory of evolution. This, he maintains, has been amply done by Pasteur and others, and a number of the most important experiments are here referred to.

The author proceeds to argue that, since evolution has failed to explain the first beginnings of life, there must have been a God who created matter, a living germ, and an intelligent mind, and that the three creations were distinct.

He gives a clear account of many of the vital as distinct from the non-vital processes, and draws especial attention to the fact that solutions of many of the higher organised products polarise light, and that the only organic bodies which have been formed synthetically are the lower organised products which do not polarise light. It is doubtful, however, whether the distinction is one which will hold much longer, as chemical methods are constantly improving.

The author adduces no new facts, but he has the merit of bringing together in a very readable form, statements more or less scattered about in several books and periodicals.

History of the Royal College of Surgeons in Ireland, &c. By Sir Chas. A. Cameron. (Dublin: Fannin and Co., 1886.)

THIS volume, which is published at the expense and by the authority of the College of Surgeons, collects together the charters and histories of the various Irish Medical Schools and Colleges, and supplies biographies of the leading members of the medical profession in Ireland, together with a list of their works.

Many curious ana are given of the old physicians; among others, of Joseph Rogers (1734), one of the first to feed fevers, who gave a patient daily for a month four to six quarts of sack-whey and two quarts of mulled canary, which was certainly vigorous treatment.

The first Society for the regulation of medicine in Ireland dates back to 1446, when Henry VI. established a Guild of Barbers in Dublin; and later on, in 1572, Queen Elizabeth granted a new charter by which women were admissible to the guild; and in those days a barber was equivalent to our surgeon. This Society lingered on until the foundation of the College of Surgeons in 1784.

This book will be of great use as a work of reference with regard to the state of medicine at any period in Ireland, and its compilation must have been a laborious labour of love on the part of the author. The biographies, which are very numerous, form the most interesting part of the work, and include a large number of world-renowned names, the greatest of which are probably Graves and Stokes.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Physiological Selection and the Origin of Species

As I was unable to be present at the Linnean Society when Mr. Romanes read his paper on the above subject, I may take the opportunity furnished by the publication of the abstract in

these columns to put forward certain views which I have long held with reference to the points raised by the author. I may remark that I am writing under the disadvantage of distance from notes or books of reference, and that I have not yet seen the complete paper. Moreover, my work of late years has run off biological tracks, and I can but regret that my remarks must, under the present circumstances, be of a more or less general character; but at any rate they may be of use as a contribution to the discussion which Mr. Romanes' carefully considered paper well merits at the hands of biologists.

In the first place, I should like to point out that evolution by what Mr. Romanes calls "independent variation," or the prevention of crossing with parent forms, is very ably discussed by Weismann in one of his earlier works, "Ueber den Einfluss der Isolirung auf der Artbildung" (1872), which essay I can commend to the notice of all interested in the subject. Weismann termed this principle "Amixie," and for want of a better word I have rendered this "Amixia" in my edition of the "Studies in the Theory of Descent," in which work the principle is also frequently alluded to.

All evolutionists will agree with Mr. Romanes that natural selection *per se* is incompetent to account for the origin of species. This has long been admitted by naturalists, and Darwin himself in later life frankly acknowledged that in the early editions of the "Origin of Species" he over-estimated the power of this agency. Nevertheless, Darwin to the last considered natural selection as the *chief agency* in the evolution of species, and no one saw more clearly than he did the difficulties which surrounded the formation of incipient species, owing to the obliteration of new characters by intercrossing with the parent form. The sterility of natural species as compared with the fertility of domesticated races is also a difficulty which Darwin fully recognised and did much towards meeting. The results of his investigations in this direction have been to break down the supposed fixity of the rule, although it must be admitted that the broad fact still remains, and we cannot but be grateful to Mr. Romanes for once more emphasising this difficulty with his characteristic clearness. It is chiefly—if not entirely—with the object of meeting this difficulty that "physiological selection" has been conceived, because, as it appears to me, the other difficulties referred to by Mr. Romanes, viz. those connected with the prevention of intercrossing and the inutility of trivial characters, are quite subordinate to this main difficulty, and need not be further considered until the admissibility (or otherwise) of physiological selection has been settled. The questions now to be decided are whether natural selection + sexual selection + correlated variability + amixia + use and disuse, &c., is really a theory of the origin of species, or whether these factors have been only made to "pose" as such? Is "physiological selection" competent to account for the origin of species?

If I interpret Mr. Romanes correctly, his theory is equivalent to the admission that amixia may become inter-racial, *i.e.* that it may arise among the individuals of a species without the intervention of physical barriers by the spontaneous origination of a physiological barrier, *i.e.* by variation in the reproductive capacity. That such a form of variation may exist I have long been willing to admit, and I do so now with all the more readiness in face of the arguments so skilfully marshalled by the author of the new theory. But, since Mr. Romanes admits the efficiency of natural selection, the question seems to resolve itself into this: Can physiological selection work independently of natural selection? If not, natural selection must still be regarded as a prime factor, and if physiological selection cannot originate a species independently of the control of natural selection, surely the latter, with its subordinate factors (of which physiological selection *may be* one), is still the chief element in the theory of the origin of species.

Let us suppose, for the sake of argument, that among the individuals of a species there arise certain varieties which are fertile *inter se*, but sterile with the parent form. There would thus arise a new race which could not be swamped by intercrossing with the predominant form, and the one species would practically be resolved into two—the parent form being still in the ascendancy as regards numbers. But the competition is always most severe between the most closely related forms, and unless the new form (arising by inter-racial amixia) possessed some distinct advantage over the old one, it would as surely be exterminated by the overwhelming majority of the parent type as it would be by intercrossing in the absence of amixia. Physiological selection thus appears to me to be as subordinate to